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(54) Method and device for bagging fruit and the like.

(57) The method comprises placing the weighed quantity of fruit (3) or the like inside the tubular net component (2), in the vicinity of one end of the rigid tube (1), then carrying out transverse clamping of the net tube after the fruit has been loaded, forming a contraction (7) which is then grasped by support means which are adjacent to the lateral surface of the rigid tube, with subsequent immediate release of the transverse clamping device for the net tube, and commencement of displacement of the support means which convey the bag which has just been filled, to the other end of the rigid tube, and which bag is welded and cut when it emerges from the tube.

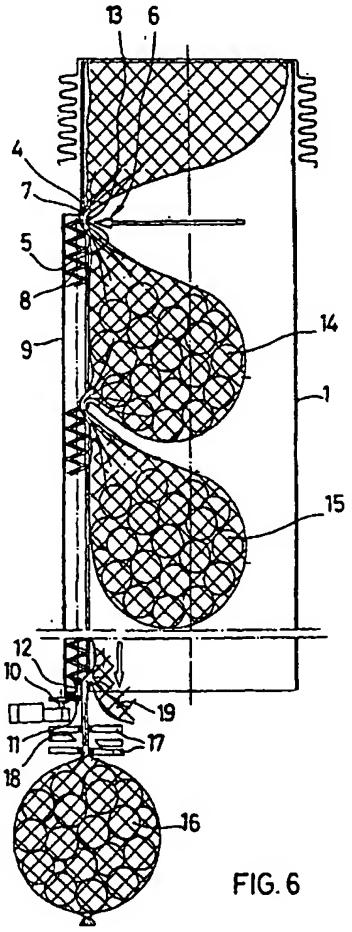

FIG. 6

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Description

The present invention relates to a method and the corresponding device for placing in bags, or "bagging" pieces of fruit, vegetables and the like, so that they can subsequently be sold.

The method and the device which are the object of the present invention provide substantial features of novelty and inventive activity, compared with those currently known for this function.

At present, different types of machines and methods are known for formation of bags from a tubular net component, from which the bags are separated in succession by clamping the upper part of each bag after it has been filled, performing welding or forming a double level, and carrying out intermediate cutting in order to separate the bag. This has given rise to installations for continuous operation in which a net bag is supplied by means of a rigid tubular body, two methods for which are known. According to the first method the net passes via the lower end of the support tube, and the pieces of fruit are introduced via the upper end, and are collected in their descent by gravity by means of the sealed base of the tubular net component, which is disposed above or below the sealing head, depending on the individual cases, or alternatively the net gathering aprons can temporarily stop the descent of the pieces of fruit before they reach the sealed base, such that the base of the net and the pieces of fruit have to pass via the sealing head in order to produce the bag, and the new sealed base of the net waits for a new load of fruit in order to start a new cycle, and for the fruit to enter the net.

According to the second method, the net passes via the upper end of the support tube for the net. The pieces of fruit are also introduced via the same end, with the sealed base of the tubular net at a point close to the input of the fruit, such that the base of the net which holds the fruit descends together with the latter until both pass the sealing head; when the bag has been produced the new sealed base of the net is moved to the upper end of the tube via the interior of the latter, and is kept in this position to wait for a new load of fruit at a height which is close to the upper end, in order for the cycle to be repeated.

This type of filling device, which is commonly used at present, has some substantial disadvantages, the first of which is that the discharge of the fruit from the upper part of the tube, so that it can be retained in the lower part of the net tube, gives rise to impact of the pieces of fruit which can be considerable, which is detrimental to the fruit, particularly for specific types of fruit or vegetables. In addition, the tension which the weight of the pieces of fruit imposes on the tubular component which surrounds the latter from the time of filling until the step of closing and cutting for separation of the bag is completed, is transmitted into tensions of the walls of the bag on the pieces of fruit, which again has a detrimental effect on the latter.

Furthermore there is a loss of time whilst the fruit descends, until it reaches the sealed base of the tubular net, which has a direct effect on production; in the second method this problem is aggravated because the sealed base has to rise to the upper part in order to reach the fruit, which restricts even further the output of the machine. In this case, when the base of the net which holds some of the pieces of fruit reaches its final position, there is generally some fruit descending which collides with that already held, and the net forms a bottleneck for the fruit descending, and delays the last pieces of fruit.

The device and method which are the subject of the present invention are designed specifically to solve the above-described disadvantages, on the basis of a method according to which, inside the tube which guides the tubular net component, the tubular net component is subjected to clamping and lateral retention, immediately after the pieces of fruit have been received inside the upper part of the guide tube, and guided and supported descending longitudinal displacement then takes place of each of the bags which have just been filled, until each bag emerges on the exterior of the rigid outer tube, and is sealed by double welding or double clamping, and cutting takes place between the two welds or clamps in order to separate the bag.

This method thus avoids the impact of the pieces of fruit discharged into the upper part of the tube, until they reach the lower part of the latter, since the path of the pieces of fruit can be very short if the present invention is applied, and in addition, since descending guiding of the supported bags is carried out, i.e. the bags are in suspension, lateral forces of the walls of the bag on the pieces of fruit are avoided, and additionally bottlenecks and delaying of the fruit are avoided, and since less time is wasted, production increases.

The device which is designed to implement the present method is characterised basically in that it comprises a rigid tubular component to guide the tubular net component on its interior, which is provided at a specific point of its height, preferably in an area which is close to its upper edge, with a longitudinal groove according to a generatrix of the tubular component, a transverse clamp being provided, preferably in the form of a flexible loop at the height of the start of this groove, which is secured to the walls of the rigid tubular component in a position of rest, and this loop closes transversely the walls of the tubular net component when the required quantity of fruit has been deposited in the interior of the latter. By this means, the tubular net component is secured to the side of the rigid tubular body in the area which corresponds to the groove, and a helical screw is provided, preferably in the form of a strong helical spring, in a tubular duct adjacent to this groove, on the exterior of, or in the wall itself of the rigid guide tube, which helical screw or spring can rotate on its own axis, and can engage the neck or contraction formed by the transverse gripper in the tubular net component, such

that when the helical spring is rotated, the bag, which is already closed but not yet sealed, is entrained towards the lower part of the rigid tubular body, suspended by the helical screw or spring, such that guided conveyance, in suspension, can take place of the bags which have just been formed. When the area of contraction of the bag emerges from the lower part of the rigid tube, welding or clamping and subsequent cutting take place, in order to separate the bag which has been completely formed. In the interior of the tube, starting from the upper end of the aforementioned spring and groove, and as far as the lower edge, there can be other recently formed bags which are in the process of being displaced towards the lower edge, which are guided by, and suspended from the helical spring, which can have sufficient strength for this purpose, such that actions of lateral crushing of the walls of the bags are prevented.

Account must be taken of the fact that although the entire description has been based on the example in the figures, in which the method is implemented vertically, an important advantage of the present invention consists in the fact that its method can be implemented irrespective of the angle of inclination of the tube which guides the bags, since the displacement of the latter is not necessarily dependent on the action of gravity, but on the existence of the system's own mechanical means which give rise to conveyance of the filled bags, and if required the guide tube for the latter can be disposed with its axis horizontally. It will therefore be appreciated that all the references to verticality and to upper and lower edges or ends must be interpreted in the broadest sense, since this can involve any inclination between vertical and horizontal, and in fact reference should be made to one end or the other of the tubular component, without these ends needing to be in the upper or lower position.

In order to assist understanding of the implementation of the method, by way of explanatory but non-limiting example, some drawings are provided of a device produced according to the present invention.

Figure 1 is a schematic plan view of a rigid guide tube for the net component with the devices which are the subject of the present invention;

Figure 2 shows, also schematically, a longitudinal cross-section of the rigid tube with the tubular net component in its interior, in the final step of initial filling of a bag;

Figures 3 and 4 both show schematic lateral views of the steps of transverse clamping of the net component;

Figure 5 shows a view similar to that in figure 2, with a net bag initially closed; and

Figure 6 shows a view similar to that in figure 5, indicating the position of the various guided bags in suspension throughout the rigid tube, as far as the lower position in which welding or clamping and intermediate cutting are carried out, in order to separate the bag.

As shown in the figures, the device which is the subject of the present invention comprises a rigid tubular component 1, which is designed to receive via its upper end the tubular net component 2, from which the various bags are produced when the interior of the tube receives the weighed loads of pieces of fruit or vegetables 3, as shown in figure 2. The rigid tubular component 1 has a longitudinal slot 4, such that in a position which is close to the start of this groove, the device has a noose or loop 5 which surrounds the net component 2 above the pieces of fruit 3, which by means of transverse action can clamp the net tube, as shown in figures 3 and 4, such that the noose or loop 5, which in a first position simply surrounds the net tube 2, reaches a final position of contraction indicated by the final position 6 of this noose or loop, in which the tubular net component 2 has been clamped transversely, forming a neck or area of contraction 7. In this position the contraction 7 is engaged by a strong helical spring 8 which is accommodated inside a tubular guide 9 adjacent to the rigid tube 1, on the exterior of the latter, and opens onto the groove 4. The spring 8 can be rotated around its own axis, by means shown schematically and conventionally in the form of a system of drive wheels 10 and 11 and an arm 12, which is integral with the lower end of the spring 8. By means of this arrangement, the upper coil 13 of the spring 8 clasps the contraction 7, as shown in figure 3, such that starting from this moment and for the remainder of its descending path, the bag is guided in its descending path, and at the same time is supported by the coils of the spring 8, which can have the necessary strength. Various filled bags can thus be produced, during the step of displacement inside the rigid tubular body 1, as can be seen in figure 6, which shows the bags 14 and 15 moving downwards suspended from the coils of the helical spring 8. When a bag reaches the lower edge of the rigid tubular component 1, the contraction is welded and cut, as can be seen in a dimensionally very enlarged manner in figure 6, which shows a bag recently formed 16 at the moment of welding or clamping and cutting, which processes are carried out by devices shown schematically in the form of the welding components 17 and cutting blades 18. The following bag 19 then will go into the aforementioned completion position.

Thus, the method according to the present invention is characterised by the following steps:

a) filling of the net tube with the pieces of fruit or vegetables, in a position which is close to the upper edge of the rigid guide tube;

b) transverse clamping of the tubular net component above the bagged pieces of fruit, and conveyance of the clamped contraction to a point on the inner surface of the rigid tube;

c) suspension of the bag on a means of support which can be displaced throughout the rigid tube;

d) release of the clamping means, which resumes its original position;

e) displacement of the series of bags formed throughout the rigid tube and in the interior of the latter, until it reaches the lower edge of the surrounding rigid tube; and

f) welding of the clamped contraction and subsequent cutting of the area in which the welding has been carried out, in order to separate the last bag formed in the tubular net component.

The transverse clamping of the tubular net component by means of the noose or loop 5 can be carried out by any appropriate means, there being shown by way of example the arrangement of both tubular guide components 20 and 21, which are also adjacent to the rigid tubular component 1, for guiding the ends, indicated as 22 in figure 3, of the noose or loop, recovery springs 23 preferably being provided in the interior of these tubular guide components, such that after positive activation of the ends of the noose or loop, recovery of the position takes place automatically by means of the action of the springs 23 and the elasticity of the material itself of this noose or loop 22, which for this purpose can consist of a steel cable, or a thread component consisting of a suitable synthetic material, such as a natural or synthetic elastomer etc. However, it will be appreciated that the function of this noose or loop can be carried out by any type of clamp, which, by clasping transversely the net tube, can secure the latter to the inner lateral wall of the rigid tube in the initial area of the vertical groove.

It will also be appreciated that the suspension and longitudinal guiding of the various bags which are produced during the process, can be carried out by any type of device which can retain and support the bags formed by transverse clamping of the latter, and can provide descending guiding of the bags throughout the tubular component.

Claims

1. Method for bagging fruit and the like, of the type in which filling is carried out of a tubular net component (net sleeve) which is guided from the outside towards the inside from one end of the guide tube, and is conveyed along the interior of the latter, characterised in that in a first step, the weighed quantity of fruit or the like is placed inside the tubular net component in the vicinity of one end of the net tube, after the fruit has been loaded, with formation of a contraction which is then grasped by support means adjacent to the lateral surface of the rigid tube, and immediately afterwards the transverse clamping device of the net tube is released, and displacement begins of the means of support which convey the bag which has just been filled to the other end of the rigid tube, and when the bag emerges from the latter, double welding or double clamping is carried out, and a cut is made between the two, in the contraction of the net tube, in order to separate a bag which has been completed from the next bag, in a process which, at the time of closing or pre-sealing of the bag, can involve application to the latter of a label, or an indicative component for standardisation or advertising, as well as a transport handle.

2. Device for carrying out the method according to claim 1, characterised in that it comprises a rigid cylindrical tube which is provided with a longitudinal slot, which extends from an area which is close to the intake end of this tube, and at the other end of the tube there is a transverse clamp to form a contraction in the net tube after the fruit which has just been weighed has been loaded, the contraction formed being secured to the inner wall of the rigid tube, and the device having a helical screw which is adjacent to the groove of the rigid tube and can undergo movement of rotation around its own axis, which screw can engage the contraction formed in the net tube by the transverse action clamp, and can convey to the other end of the tube the bag which has just been formed, suspended from the rotatory helical screw itself.

3. Device for bagging fruit and the like according to claim 2, characterised in that the helical screw has the structure of a rigid helical spring, which is connected at one of its ends. to a rotary activating device, and is disposed adjacent to the longitudinal slot of the rigid tubular body.

4. Method and device for bagging fruit and the like, according to claims 2 and 3, characterised in that the rigid helical spring is guided inside an auxiliary tubular body which is secured to the exterior of the rigid tubular component, and communicates with the longitudinal slot of the latter.

5. Method and device for bagging fruit and the like, according to claim 2, characterised in that the transverse clamp consists of a resilient, resistant noose or loop, which can be secured by its own means to the interior of the rigid tube, and which is activated transversely in order to clamp the net tube.

6. Device for bagging fruit and the like according to claim 5, characterised in that the resilient noose or loop is activated by traction of its guided ends through tubular components which are adjacent to the tubular body which supports the helical spring, and are provided with inner recovery springs.

7. Device for bagging fruit and the like according to the preceding claims, characterised in that the guide

tube for the bags of fruit can be disposed in a fixed manner in any position of inclination between vertical and horizontal.

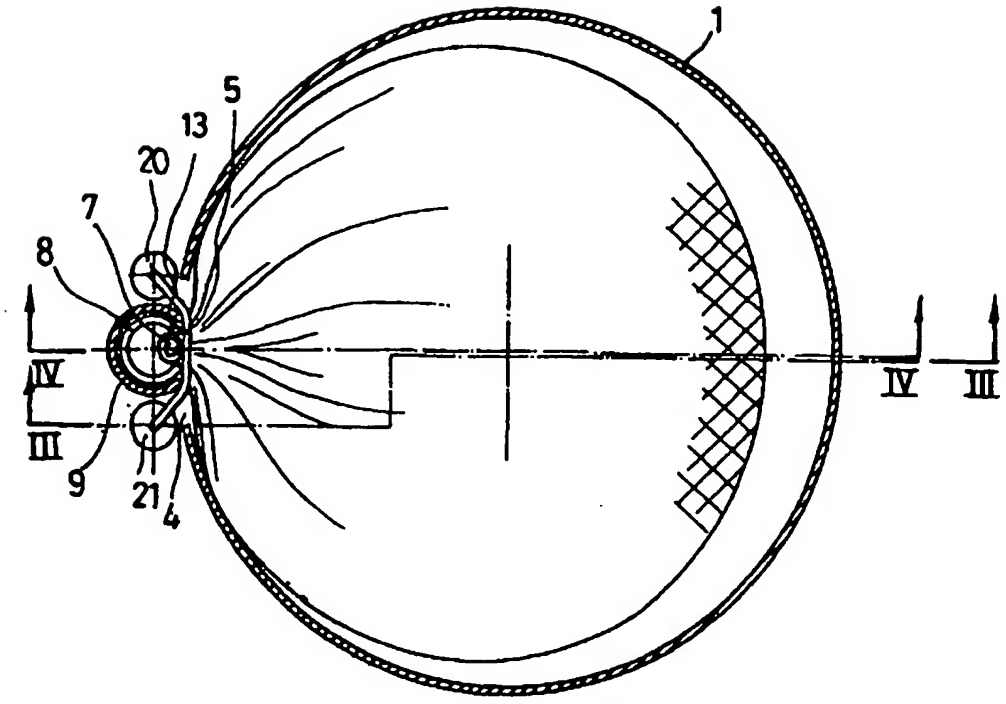

FIG. 1

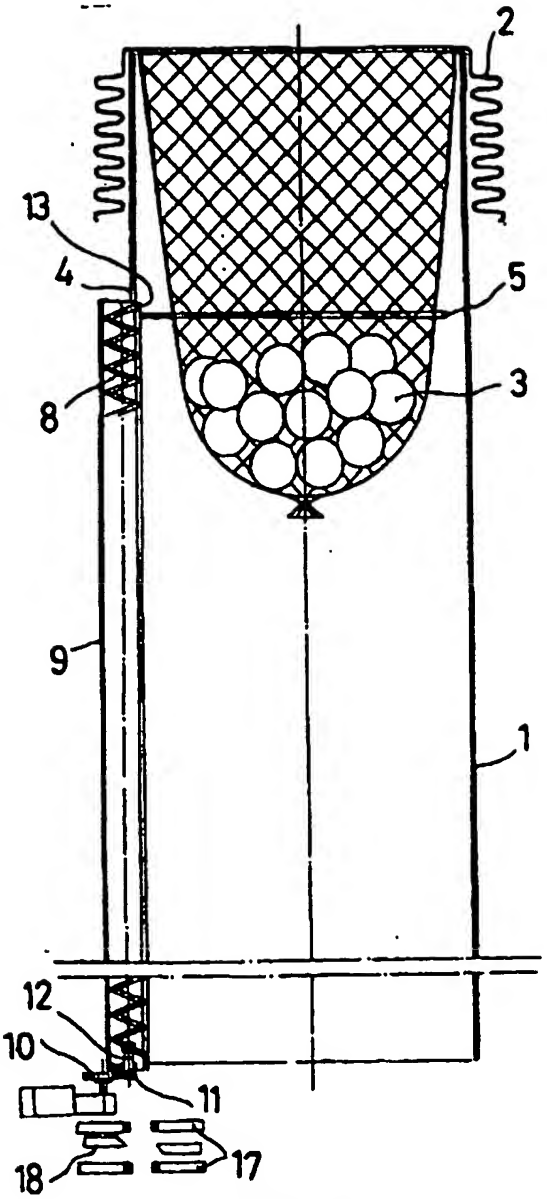

FIG. 2

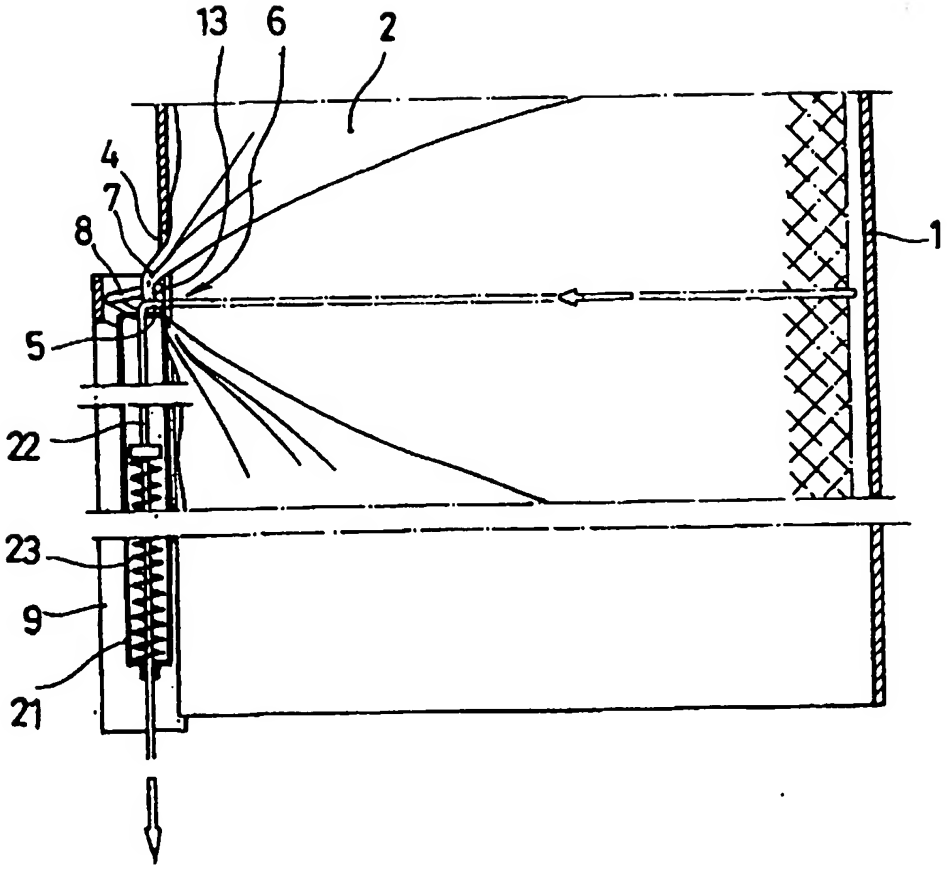

FIG. 3

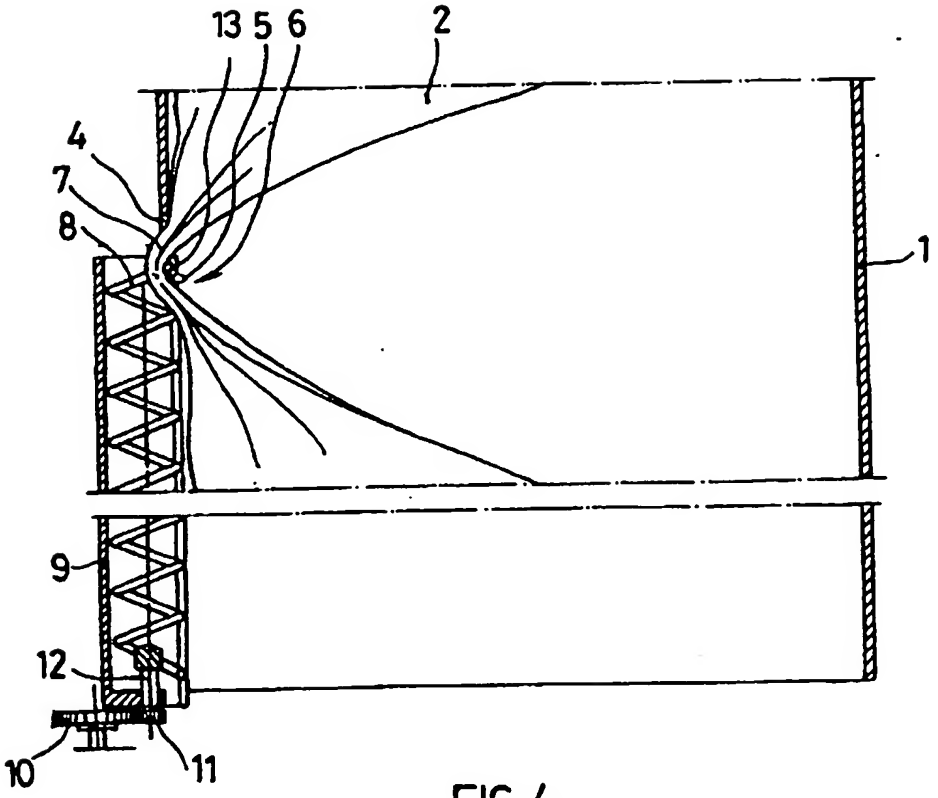

FIG.4

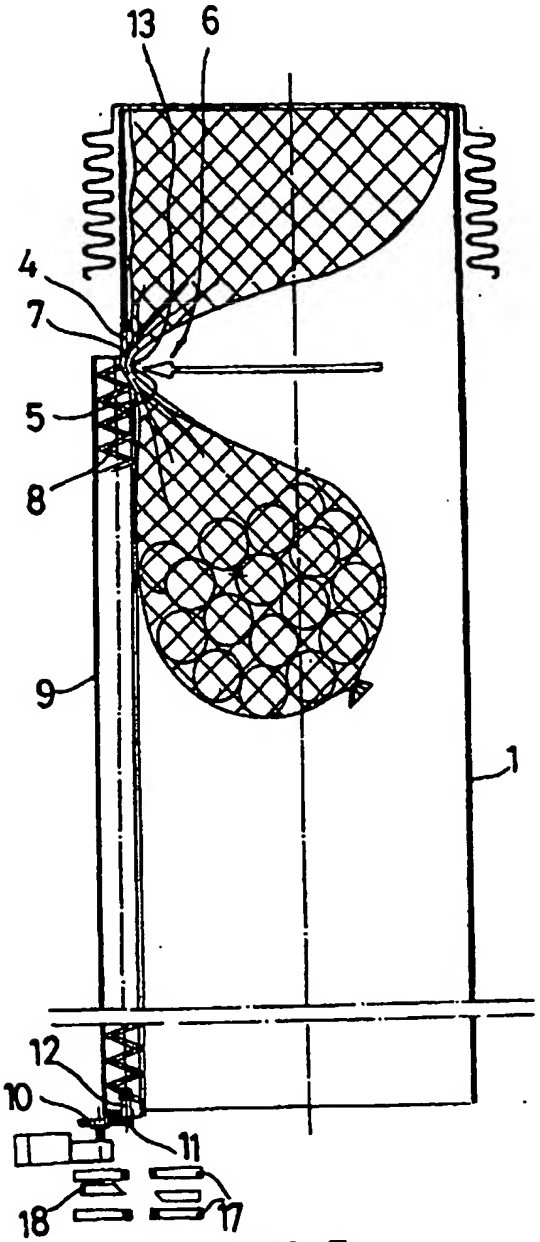

FIG. 5

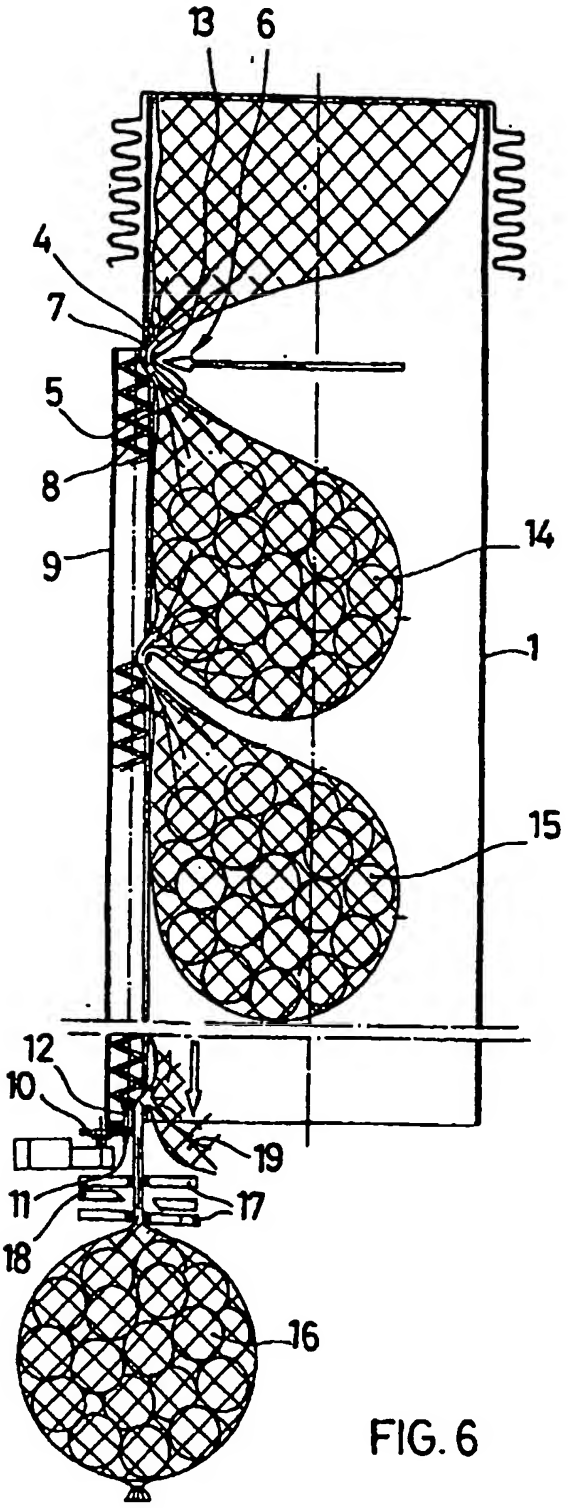

FIG. 6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 50 0121

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 5 155 976 A (FUJI JUKOGYO) 20 October 1992 * column 6, line 16 - column 8, line 65; figures *	1,2	B65B9/15
A	EP 0 281 355 A (PROCESS IMPROVEMENTS) 7 September 1988 * column 3, line 14 - column 5, line 34; figures *	1,2	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	14 September 1998	Jagusiak, A

CATEGORY OF CITED DOCUMENTS

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